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ABSTRACT

The teacher's role and his or her understanding of it in the learning situation is one variable that needs to be included in any discussion of educational intervention. Bereiter and Scardamalia's (1991) teaching models provide a matrix for organizing teachers' classroom practice. Briefly, each model can be understood as a different view on the part of the teacher of the role of a teacher in learning. The study examined the effects of portfolio use on students' ability to reflect on their own learning in nine elementary classrooms, some of which utilized CSILE as a learning tool. Teachers were interviewed in order to assess which model of teaching informed their practice. The teachers' reflections on learning cluster into two of the teacher models discussed by Bereiter and Scardamalia and furthermore map onto differences in students' ability to reflect on their work via commenting in the portfolios. Appendices contain the interview protocols used in the study. (Author/IAH)

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Reflecting on Teaching

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Reflecting on Teaching (Elizabeth A. Lee, (CACS, OISE)

Abstract The teacher's role and their understanding of it in the learning situation is one variable that needs to be included in any discussion of educational intervention. Bereiter and Scardamalia's (1991) teacher models provide a matrix for organizing teachers' classroom practice. Briefly each model can be understood as a different view on the part of the teacher of the role of a teacher in learning. The study examined the effects of portfolio use on students ability to reflect on their learning in nine elementary classrooms some of which utilized CSILE as a learning tool. Teachers were interviewed in order to assess which model of teaching informed their practice. The teachers' reflections on learning cluster into two of the teacher models discussed by Bereiter and Scardamalia and furthermore map onto differences in students' ability to reflect on their work via commenting in the portfolios.

A frequently neglected aspect of the learning situation is the role of teacher beliefs and intentions. Teaching is an act of interpretation. What teachers believe to be the purpose of education guides their practice, and, how teachers' construe their role in the learning process contributes to their instructional decisions.

A fair criticism of much educational research is that it often fails to take into account the intentional nature of human behaviour. Both teachers and students are frequently viewed as objects whose behaviour in the educational setting is the result of external forces rather than the result of intentional agency. As an outgrowth of the

empirical orientation of psychological research, most educational research seeks to test the effect of altering one aspect of the educational situation on student performance, be it a new organizational structure, a method of content presentation, or a use of technology. Given the complexity of classroom research this may be the only realistic course of action. However classroom research that neglects to the examine the subjective beliefs that underlie the behaviour of teachers can only make weak claims about the effect of the particular intervention. The implementation of programs, lessons and research are all filtered through the teacher's beliefs about the goals of education.

Some recent research in the area of effective schools has examined the interplay between teachers' thought and action (Clark and Peterson,1986). Studies have focused on the interaction between a teacher's pedagogical knowledge, content knowledge and instructional goals. Effective teachers are those who have formulated what is described by Shulman (1986) as pedagogical content knowledge, that is a representation of the concepts within a field that takes into account student difficulties in comprehension and formulates instruction on this basis. Studies have shown that, while most teachers have comparable content knowledge and pedagogical knowledge, many failed to integrate the two.

Research in science education has examined the impact of both student beliefs (naive theories) and teacher beliefs about learning processes upon student's acquisition of science concepts.

Smith and Anderson (1984) discuss three unsuccessful views of teaching and learning science that are common among elementary

school teachers. These are; didactic wherein students learn if material is presented clearly; activity-driven in which learning occurs if students follow a sequence of activities; and discovery-orientated in which students learn if they are allowed to explore materials freely. They argue that none of these approaches to teaching and learning is as successful as conceptual change teaching; the two components of this form of teaching are a, commitment on the part of the teacher to conceptual change as a necessary component of learning and, b, knowledge of content and of methods for translating this into curriculum goals. In essence what is needed is pedagogical content knowledge.

Studies by Hollon and Anderson (1987), Roth, Anderson & Smith (1987) detail the impact that a teacher's implicit learning theory has upon their implementation of a science unit. Teachers were categorized on the basis of patterns of classroom interactions with students while teaching a science unit that was provided by the researchers along with their responses to an interview that assessed their pedagogical content knowledge. The teachers whose classroom behaviour and beliefs about learning and teaching did not exemplify a conceptual change view were unable to appropriately implement the given research units. Their personal model acted as a lens through which they assessed the student's performance and formed the basis of their instruction.

Bereiter and Scardamalia (1987) proposed a schema to describe teachers' models of teaching. These models can be understood as a different view on the part of the teacher concerning the role of a teacher in learning. Model A and B teachers both see the teacher as

the cause of learning, Model A at the lowest level perceives the teacher's role as being one who imparts skills and knowledge, while Model B teachers at the highest level see themselves as the facilitator of experiences by controlling the form and flow of information to students. Model C teachers perceive their role not solely as a facilitating of learning but rather as a structuring of the students' experiences in such a way that the student comes to structure their own learning over time. In Model A, teaching is an exercise, the teacher has the role of a supervisor who regulates the quantity and quality of work. In Model B, teaching is socialization, the teacher has the role of both setting cognitive goals and controlling the process of learning. In Model C, teaching incorporates aspects of B but the role of the teacher is to seek to turn the responsibility for learning over to the student.

Differences in teachers' beliefs about their role in learning come into focus when the issue of control is examined. In the commonest sense, control can be thought of in terms of discipline, a teacher has control if there is order and direction in the classroom. Control sets the tone of interpersonal relations and in this characterization is the responsibility of the teacher. Control can also encompass the idea for the location of responsibility for learning, who controls whether learning occurs or not. All teachers agree that there needs to be some degree of involvement on the part of the student for learning to occur. Given a minimal amount of interest by students, teachers differ over where they see the responsibility resting for ensuring that learning takes place. This is summed up in the terms they use to describe their role, either as one of instructing, in which learning

arises from lessons given by the teacher or as one who facilitates, and supports, in which learning arises from the efforts of the students to grapple with knowledge. In the context of the portfolio study both CSILE and non CSILE teachers were interviewed. This self report data was the basis for classifying the teachers into the different models.

The teachers whose classes participated in the portfolio study were interviewed twice, at the beginning and end of the school year. The questions ranged from the specifics of classroom scheduling, methodologies followed in teaching the three subject areas of the portfolio study, evaluations of the portfolio study to beliefs about the characteristics of successful learners and self assessment of the effect of CSILE on their teaching. See appendices 1 and 2. It was hypothesized that the different models of teaching that were reflected in the teacher's self report would also be reflected in their classroom practise.

The teachers involved in the study divided into two main groups, the two groups' underlying beliefs and their intentions for their students were quite different. Both groups expressed an interest in having children learn but saw the route to that goal mediated by different processes and in their classroom practice strove to achieve success through these intermediary goals. One group's orientation stressed social relations, self-esteem being the key to academic success, and sought in their practice to ensure that students had frequent positive experiences. The responsibility for these experiences lay with the teacher. The other group's orientation stressed cognitive activities as the route to learning in the classroom,

while acknowledging that social relations could influence this. Within this group teachers differed in where the responsibility lay for achieving academic success.

Those teachers who held model C of teaching saw the location for the control of learning as resting in the students unlike teachers who held model B. These teachers spoke of learning as the result of a student individually pursuing a topic in depth rather than as a result of instructional activities common to the class. Teachers who held model C were less concerned with mastery of particular skills than with the evidence of reflectiveness on the part of students.

The terminology used by the teachers in discussing their classrooms differentiated between model B and C teachers. Phrases that reoccur in response to a number of questions reflect some of the assumptions underlying the two models.

Model C	Model B
depth of thought	attentive in lesson
kids arrange own time	lesson
teacher gives up control	instructor
kids more in charge	testing
kids proud	check work
be reflective	involved

In response to, What do you think is the greatest difficulty in a classroom faced by a teacher?

Model C	Model B
learning	management
time, motivating	interruptions

A question about what students gain from doing portfolios revealed different concerns.

Model C	Model B
look at things in depth	be critical
be reflective	evaluate
think about feelings	organizational tool
sense of growth	
appreciate own and others work	

When asked,What do students need to become successful learners?

Model C	Model B	Model A
learning goals	**social goals**	**task goals**
Students have to come to the realization that education and learning is not something that someone does to you, it's something that you do to yourself		
good self image	self esteem	attitude in lesson
	desire to learn	positive attitude
	but this is instilled by teacher	basic skills
	seeing a need to learn	
	pride	

Was the portfolio study useful for teachers?

Model C	Model B
yes	yes
as a way of identifying misconceptions	as an organizational tool

When asked if their teaching had altered this year and if so why?

Model C	Model B
yes	yes
had never had kids reflect before	organization of work
and it's worthwhile	in response to the ability
	level of the class

The CSILE teachers were asked, Has CSILE changed their teaching?

Model C	Model B
View role as different	Teach fewer topics
students more independent	
more intentional about learning	
students more self directed	
have given up control because of CSILE and portfolio	
Do very little teaching cause of CSILE	

A closer examination of two CSILE teachers reveals the interaction between the use of writing portfolios by students in CSILE classrooms and the teachers' changing view of education. The first

teacher had used CSILE the previous year. At the initial interview she said that she had never used any form of portfolios nor had the children evaluate their own work to use her own words "in such an intense way." She initially thought the benefit of the portfolio study was more as an activity, the process of having the child select a piece of work, than in the reflective cognitive process of writing about his/her work. When asked how well she thought using portfolios would fit into her program she replied that "it fits in all right, there's enough work that the children can choose from". In line with this interpetation that the purpose of the activity was primarily the choosing of the piece of work, when asked to predict how useful the portfolio would be to her she replied that "I'm not sure that it's all that useful to me because the children are picking the work that I think they would have picked anyway." In discussing which subject area the portfolio work would be most valuable in she stated that writing would be most useful as it was the most creative again reflecting the view that it was the activity of choosing that was of importance " some of the science everyone's doing it, you get an idea of the type of science that they like to do." The individual nature of writing she felt provided more information.

Regarding the benefit that children would get from participating in the study she said, " I think anything that gets them thinking about what they've done is a good thing, they are looking at it in a positive way," thus emphasizing the motivational benefit.

A response by this teacher in the initial interview perhaps indicates one of her underlying beliefs about education. She was asked to predict how capable her students would be at commenting

on their own and each other's work, she responded by saying "I think it's something they have to learn. And I think it won't work unless the teacher is dedicated in helping them do it." She viewed herself as an integral part of the process. This teacher was also unique in that she took it upon herself to instruct her students in this, " I talked about it to the whole group, you know I'll put something on the board and I'll say well, what can you say about this, what do you comment? They have to learn." Here we see a typical Model B response.

This teacher's writing program was particularly rich, she planned for a wide variety of forms over the course of the year, from personal letters, business letters, descriptions, expositions, narratives, plays, to different types of poetry. Her class on average wrote in different forms for an hour a day. When questioned as to the methodology that she used she described a sequence whereby lessons were drawn from the difficulties the children were having in their work which would then be used as a basis for a class lesson and an assignment based upon the lesson.

This teacher's understanding of process writing differed from that of the other portfolio teachers, for her it was more than just doing the activity, learning by osmosis interpretation, with concepts and structures being abstracted from mere exposure. Rather, this teacher appeared to firmly believe that the role of the teacher was to make explicit the sequence and specifics of the process; that the learning lay in students coming to recognize these details for themselves and that this depended upon the teacher having that as her goal. A Model C response. This approach of providing structured lessons based on

the writing did not appear in the other teachers' description of their writing program. They described process writing as a method that did not involve structured lessons but rather was more akin to editing, where they helped children individually in conferencing or taught a lesson which was expected to carry over into the children's work. This teacher described an ongoing process in which writing was a focus of discussion and reflecting on writing an integral part of this.

This teacher appeared to be generally oriented toward reflecting upon her teaching; responding to a question about cooperative learning she provided a summary of her beliefs: "I think you have to approach teaching eclectically, you teach formally, you teach in a cooperative group, you teach activity based, you use everything so you hit every child and give them all the chance to learn a concept. And I don't think you can teach in any one way and be truly successful and reach every child in the class. You know that's one thing we have to be careful about that we don't jump on bandwagons and think that there's only one right way cause I don't think there is." When asked to select the most important factor in children becoming successful learners she said "I think that you can't just say one." At the beginning of the study she had doubts that the students would necessarily benefit from reflective commenting. " I think I believe in research. I think it's an interesting concept that the kids will become better learners by evaluating the work that they've done already. I think that's interesting to look at. I'm not convinced that it's true. I think that there are so many other things that come

in when someone's learning that I think that may help in their learning. I don't know."

By the end of the year she had changed her view and had come to see reflective commenting as an important factor in helping students learn. "They learn to be reflective, and they learn to think about what they've been doing. They have to stand back and think: What have I learned? What is it that I have enjoyed doing, and I think they can do that now, much better than they could at the beginning of the year. At first I thought that, you know, when they were making comments on comments, oh, is this worthwhile? But I really think it's been good for the kids and for the teachers." She felt that though the portfolios took time to do properly and that the students needed instruction in how to make useful comments it was beneficial "I found it to be very helpful, because I found from the kids comments and their work, where misconceptions lie." This teacher came to value the commenting in portfolio work not only for the insight that it gave her into students' conceptual difficulities but also for a change brought about in their sensitivity and awareness of other students' feelings. She believed that one of the major benefits of reflective commenting for the students was a change in attitude towards their school work. She felt that much of their reflection was on their feelings not on the work itself but that this increased self awareness in relation to their work had a positive impact.

The use of portfolios was seen as having a major influence on the students writing. The teacher thought that through the activity of selecting a piece of writing and class discussion that focused on what made a particular piece an interesting example both the students and

herself had become more skilled at analyzing writing and that this was evident in the students work.

This teacher in particular demonstrated the power of intentional learning. At the beginning of the year she could be placed in model B. She stated that she wasn't convinced that having students evaluate their own work would result in students becoming better learners. However this teacher took this as a question to be explored in her classroom. She intentionally incorporated the reflective commenting of the portfolio work as an on-going component of her classroom behaviour. Student self evaluation became a regular feature of the students activities. In doing so she came to structure the students experiences such that they came to assume more responsibility for their learning. Her students scores on reflectiveness for all types of work were the highest. In essence as a feature of intentionally encouraging students to be more reflective she moved to model C of teaching.

The interpretation that a teacher places upon an activity and the degree to which they believe it furthers their purposes in the classroom determines the impact that a program has. This is exemplified by another CSILE teacher who also fit Model B at the beginning of the year. In contrast to the case study teacher this other teacher did not change teacher models during the year.

This can perhaps be attributed to a strong belief held by this teacher. In response to a number of questions he stressed social relationships, as he said " the rapport that I have with a class is important, I think that if it's not a good relationship that very little gets learned in the classroom".

Unlike the case study teacher he did not view the portfolio study as offering a possibility for learning to his students, rather it was an additional activity that he was willing to participate in. Holding this interpretation he felt that it was not likley to be as he said "particularly relevant to his program."

In contrast to the case study teacher who though not convinced of the usefulness of portfolios, was open to exploring it with her students, the second teacher's belief that portfolios lacked relevance to his goals in the classroom, led him to not incorporate them as an integral part of his teaching. Consequently the portfolios had little impact upon his students' performance.

Writing

An examination of the class data illustrates the interaction between the implementation of the portfolios and students' performance on self and peer commentary in writing.

----------insert table 1 about here----------

----------insert table 2 about here----------

Tables 1 and 2 present the mean pre and post-test scores for self and peer commentary as a function of class. There was a main effect of class for self F (6, 861) = 10.93, $p < .001$, Mse = .23 and peer commentary F (6, 847) = 10.84, $p < .001$, Mse = 17. Specific comparisons of classes for self commentaries revealed that the case study scores LSD Multiple Range, obtained by the students from the

case study class were significantly higher than the other classes on the post-test.

The relation between the children's reflections and the quality of their work is of interest. First, writing selections across CSILE, time of selection and grade were classified as narrative, expository, poems, assignments and rote pieces (spelling, grammar, penmanship). Only the first two types, narrative and expository writing, were analyzed. Writing quality was rated on four dimensions: a sense of audience, organization, ideas, and vocabulary. Two independent raters assessed each measure separately for each grade. As would be expected the quality of writing scores and the students reflective scores were correlated. A positive correlation between responses to the first self-commentary question "What is this work about" and the quality of work was found as was a significant positive correlation between the self commentary question "What did you learn from doing this piece of work" and the students scores for quality of work on the post-test.

----------insert table 3 about here----------

It was not possible to analyze writing quality by class as the sample size is too small. In the instance of the case study clas eight of the students chose a poem as their piece of work for the post-test, which we were unable to rate for quality of writing on our scale. However none of the students in this class picked a piece of rote work on the post test. This was not the case with other classes, in particular the non CSILE classes picked more instances of rote work

for inclusion in their portfolio on the post-test than did CSILE classes. As well some students picked the same piece of work for their pre- and post-test sample. On the post-test the CSILE classes other than the case study class chose instances of expository or creative writing.

The beliefs and intentions of a teacher influences their interpretation of their role and directs how they implement a curriculum. The different manner in which the portfolios were understood and utilized reflects the models held by those teachers. Student scores for both the reflective commenting and writing quality are related to the teacher model. Students in CSILE classes in which the teacher was classified as holding a model C of teaching obtained the highest scores for reflective commenting on the portfolios. Whereas students in CSILE classes in which the teacher held a model B of teaching had lower reflective scores though their scores were higher than those of non CSILE classes.

Table 1.

Mean self commentary score in the fall and spring for each class for writing mathematics and science.

		Fall			Spring		
DOMAIN		Writing	Math	Science	Writing	Math	Science
CLASS	TEACHER MODEL						
non-CSILE	A	1.62	1.44		1.51	1.40	
non-CSILE	B	1.39	1.48	1.67	1.98	1.73	1.67
non-CSILE	B	1.19	1.59	1.25	1.33	1.49	1.49
non-CSILE	B	1.21	1.10	1.63	1.40	1.59	1.68
CSILE	B	1.34	1.91	1.67	1.49	1.47	1.49
CSILE	C	1.61	1.30	1.31	2.24	2.23	2.01
CSILE	C	1.26	1.59	1.44	1.80	1.81	1.77

Table 2.
Mean peer commentary scores in the fall and spring for each class for writing mathematics and science.

		Fall			Spring		
DOMAIN		Writing	Math	Science	Writing	Math	Science
CLASS	TEACHER MODEL						
non-CSILE	A	1.32	1.22		1.28	1.12	
non-CSILE	B	1.33	1.12	0.83	1.68	1.30	1.25
non-CSILE	B	1.21	1.10	1.08	1.18	1.27	1.21
non-CSILE	B	1.35	1.20	1.44	1.42	1.23	1.24
CSILE	B	1.42	1.11	1.14	1.99	1.76	1.64
CSILE	C	1.26	1.64	1.49	1.65	1.38	1.21
CSILE	C	1.34	1.17	1.31	1.43	1.52	1.40

Table 3

Correlations Between Self Commentary and Writing Quality

Writing Quality	Self Commentary 1	Self Commentary 3
Audience	.1864, $p<.05$	.1476, $p<.05$
Ideas	.2024, $p<.01$	.1541, $p<.05$
Organization	.2102, $p<.01$	.2868, $p<.01$
Vocabulary	.1890, $p<.01$	.1562, $p<.05$

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Appendix 1
Teacher Interview 1

Teacher_____School _____Grade___Date_____#of students___

1.How did you come to be involved in the portfolio study?

2.Did you already use some form of portfolios already in your class?

3.To what extent do you predict that portfolio study will be useful to you? In what manner?

4.As the study is set up now do you have any concerns about how it is organized, timing, what it covers?

5. Would you like to have feedback, what would you like to know and what kind of format would you like it to be in?

6.How do you think your class will handle this, participating over the period of the year? And do you see any problems for them and if so what kind of problems do you forsee?

7.In the three subject areas that we're looking at, for which do you think portfolio work will be the most valuable, and in which the least useful?

8.What kind of benefit will the students get from participating in the portfolio study?

9. Portfolio work requires students to comment on their own and each others' work. How capable do you predict your class will be in doing this, for themselves and for the other students?

10.Do you have planned as part of your program activities that you predict will help students gain these skills?

11.If you feel that students need additional skills to handle portfolio work are you interested in having us come and teach some of these skills?

12. How does this class compare to others that you've taught? How do you think this will affect the portfolio study?

13. Are there any particular problems that you're coping with that will affect the dynamics of the group?

14. Do you teach all your students all the academic subjects, at least the three domains that we're looking at?

15.Of the overall instructional time, what percent do you estimate is spent in large group, small group, or individual?

16. In the areas that we're looking at, how do you organize time over a week? How often, approximate what amount of time do you spend on writing, maths and science? How is this organized, large,small or individual grouping?

17.Do students select the topic of study in an area? How is the selection made, from a class generated list, a teacher generated list, from a textbook resource, or individually generated?

18.For maths what percentage of time is spent in large group, small group and individual instruction?

19.Do the students work from the board-------- % time----------
texbooks-------- % time----------
dittos---------- % time----------
workbooks------ % time----------
with manipulatives-- % time----------

20. For science what percentage of the time is spent in large groups, small groups, individual instruction or on computers?

21. How are the science topics selected? Textbook, ministry curriculum, school based curriculum, other.

22. What form does most of the student work take? Project work, experiments, writen exercises, written research(library), textbook questions, other?

23. For writing, what different types of writing do you plan for?

24.How frequently do students write and for what length of time?

25.Describe the instruction you give in writing. Is there a particular resource or methodology that you use?

26. Do you use any cooperative learning techniques as part of your instruction?

27.What do you think our purpose is in doing the portfolio, study?

28.What do you think is the most important factor in children becoming successful learners?

Appendix 2

Teacher Interview 2

Name_____Date_____

1.How do you feel about the portfolios? Has it been a burden, made no contribution or been useful for the class.

2.Do you think the students gained anything from using the portfolios?

3.Has the use of portfolios affected your teaching in any way? How?

4.How do you know when you're successful in your teaching?

5.What is the greatest difficulity in the classroom faced by a teacher?

6.Without any formal testing how do you determine a student's ability?

7.If a student is of low ability how do you handle that? Elaborate

8.If you were designing the portfolio study, how would you change it, are there questions that we should have asked?

9.What do the children gain from doing portfolios as an ongoing classroom activity?

10.In looking at the student's responses over the year, what would you be interested in finding out?

11.What do you think is your class' attitude toward the portfolio? Do you think the students see it as an exercise that they have to do or do you think they value it for themselves?

12.Looking back over the year how has this year's class been?

13.How did you come to be a teacher? What made you choose it? There's a whole range of reasons why people end up with teaching as a career.

14.Has your teaching altered this year? If so, how and what was the cause?

15.What is the most important factor in children becoming successful learners?

16.Any other comments about the study you would like to add?

17.For CSILE teachers.
Has CSILE changed the way you teach? In what ways?